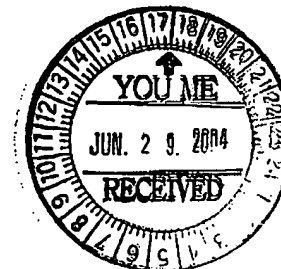


## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)



Applicant's or agent's file reference OPP030181KR	<b>FOR FURTHER ACTION</b> see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. <b>PCT/KR2004/000520</b>	International filing date (day/month/year) <b>12 MARCH 2004 (12.03.2004)</b>	(Earliest) Priority Date (day/month/year) <b>13 MARCH 2003 (13.03.2003)</b>
Applicant  <b>SAMSUNG ELECTRONICS CO., LTD. et al</b>		

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (See Box No. II)

3. ☒ Unity of invention is lacking (See Box No. III)

4. With regard to the title,

☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:  
Crystallization apparatus and method of amorphous silicon

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the drawings to be published with the abstract is Figure No. 1

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

b. ☐ none of the figure is to be published with the abstract.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2004/000520

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

- I. Claims 1-4, 6-11, 13-14, 16-18, and 20-27 directed to a crystallization apparatus and method of amorphous silicon.
- II. Claims 5 and 7 directed to an amorphous silicon layer.
- III. Claims 12 and 19 directed to an sequential lateral solidification(SLS) method.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any addition fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2004/000520

**A. CLASSIFICATION OF SUBJECT MATTER****IPC7 H01L 21/324**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC7 B23K 26/00, H01L 21/26, H01L 21/268, G01J 1/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and applications for inventions since 1975

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

KIPONET, ESPACENET "laser annealing, crystallization, sequential lateral solidification"

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 03/24905 A1 (Koichiro Tanaka) 06 February 2003 see the whole document	1, 3-6, 12, 15, 19
Y	KR 02-94062 (NEC) 16 December 2002 see pages 1-3 and Figs 1-7, 15-16	2, 7
A	see the whole document	1, 3-6, 8-27
Y	WO 02/86954 A1 (Trustee of Columbia University) 31 October 2002 see abstract and claims	2, 5, 7, 12, 15
A	see the whole document	1, 3-6, 8, 11-12, 14-16, 19-21
Y	US03/42397 A1(Koichi Tatsuki et al.) 06 March 2003 see Fig.5, Fig 8 and pages 5-6	1, 4-6, 12, 15, 19
Y	JP05-226275(NEC) 03 September 1993 see the whole document	1-8, 12, 15, 19

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family


Date of the actual completion of the international search

21 JUNE 2004 (21.06.2004)

Date of mailing of the international search report

22 JUNE 2004 (22.06.2004)

Name and mailing address of the ISA/KR


 Korean Intellectual Property Office  
 920 Dunsan-dong, Seo-gu, Daejeon 302-701,  
 Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

MAENG, Sung Jae

Telephone No. 82-42-481-5727



**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

PCT/KR2004/000520

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US20030024905A1	06.02.2003	JP15-151916A2 KR03-11724A CN1405861A TW552645B	23.05.2003 06.02.2003 26.03.2003 11.09.2003
KR 02-94062A	16.12.2002	W001088968	22.11.2001
W002086954A1	31.10.2002	CA2412603A1 EP1354341A1	31.10.2002 22.10.2003
US20030042397A1	06.03.2003	JP15-059858A2	28.02.2003
JP05-226275 A	03.09.1993	none	